

Clearing the Air: Asthma and Indoor Air Exposures



- Institute of Medicine report on what is known about indoor air exposures and asthma
 - Exposures and asthma onset
 - Exposures and worsening asthma
 - Effectiveness of interventions
- 12 person expert panel convened in late 1998, final report issued January 2000
- <http://books.nap.edu/books/0309064961/html/>





Exposures Addressed in IOM Report

■ Biological

- Animals
 - Cats / dogs / rodents / cows / horses / birds
- Cockroaches
- House dust mites
- Endotoxin
- Fungi
- Plants
- Pollens
- Infectious agents

■ Chemical

- NOx
- Pesticides
- Fragrances
- Plasticizers
- VOCs
- Formaldehyde
- Environmental tobacco smoke
- Ozone / PM/ SOx



Classification Scheme of IOM Report

- Distinction between *development* of asthma and *exacerbation* of asthma
- Categories of evidence
 - Sufficient evidence of a causal relationship
 - Sufficient evidence of an association
 - Limited or suggestive evidence of an association
 - Inadequate or insufficient evidence to determine
 - Limited or suggestive evidence of no association



Exposures Associated With Exacerbation of Asthma

- Sufficient evidence of a causal relationship
 - Environmental tobacco smoke (preschool aged children)
 - Cat / Cockroach / House Dust Mite
- Sufficient evidence of an association
 - Dog / Fungi – Molds / Rhinovirus
 - NO_x / NO₂



Exposures Associated With Exacerbation of Asthma

- Limited or suggestive evidence
 - ETS (other than preschoolers) / formaldehyde / fragrances
 - Birds / *C. pneumoniae* / *M. pneumoniae* / RSV
- Inadequate evidence
 - Pesticides / Plasticizers / VOCs Everything else

Exposures Associated With Development of Asthma



- Sufficient evidence of a causal relationship
 - House Dust Mite
- Sufficient evidence of an association
 - Environmental tobacco smoke (preschool aged children)
- Limited or suggestive evidence
 - Cockroach (infants) / RSV
- Inadequate evidence
 - Everything else
- Limited or suggestive evidence of no association
 - Rhinovirus (adults)



Sufficient Evidence of an Association for Mitigation Strategies for House Dust Mite

- Humid climates
 - Air conditioning for humidity control
 - Reduce nests / bedding measures
- Moderately or seasonally humid
 - Open windows / upper floor apartment
 - Reduce nests / bedding measures / chemical treatment
- Dry areas
 - Daily ventilation

Limited Evidence for Effectiveness of Mitigation Strategies for Cockroach Exposure



- Combination of extermination and control of allergen reservoirs
- Extermination alone ineffective; cleaning alone ineffective



Limited Evidence for Effectiveness of Mitigation Strategies for Cat Exposure

- Remove cat
 - May also require removal of reservoirs of allergen to be effective
- Washing cat



Effectiveness of Mitigation Strategies for Reducing ETS and Chemical Exposure

- Smoking cessation
- Air cleaning
 - Technologically capable of reducing concentrations
- Increasing ventilation
 - Technologically capable of reducing concentrations



Research Recommendations, IOM Asthma Report

- Exposure
 - Prenatal exposures
 - Assessment of age at first exposure
 - Importance of gene – environment interaction
- Strategies to reduce exposure
 - Rigorous mitigation trials
 - Importance of considering target population
- Integration of health and healthy environment sciences